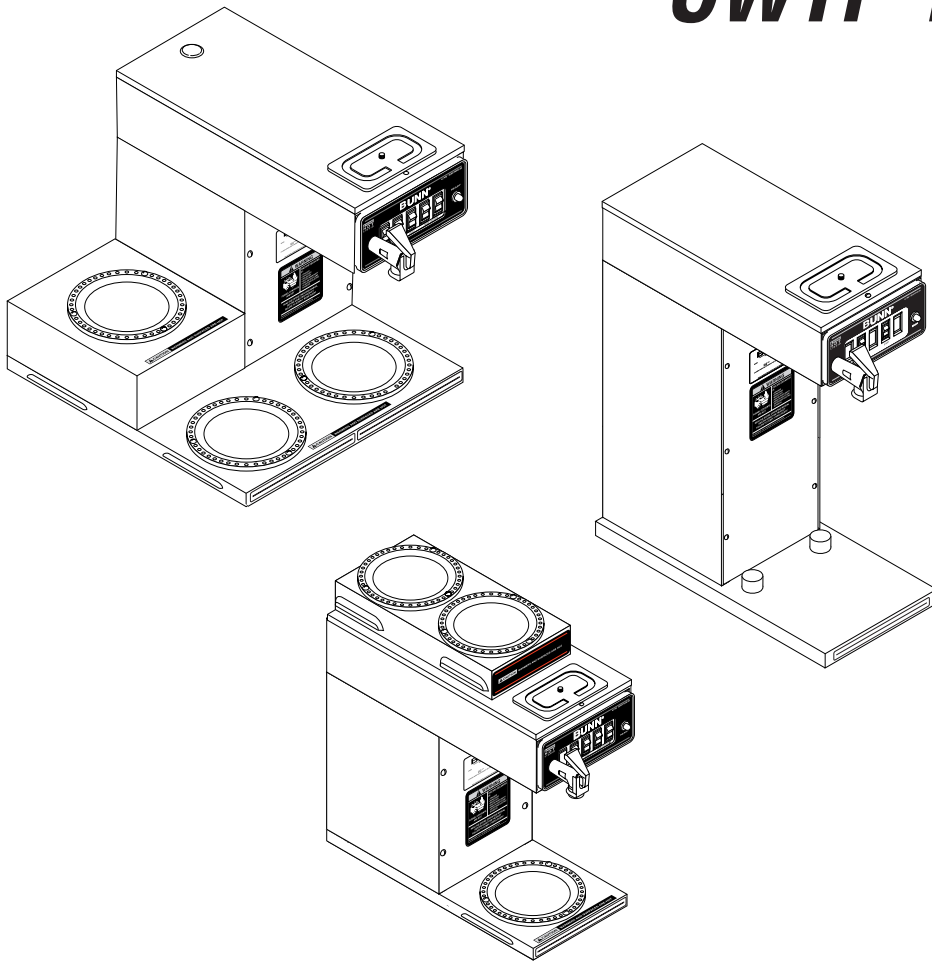


# BUNN®

***CWTF-MV***  
***CWTF-APS-MV***  
***CWTF-TS-MV***  
***CWTF-TSR-MV***



## **OPERATING & SERVICE MANUAL**

### **BUNN-O-MATIC CORPORATION**

**POST OFFICE BOX 3227**

**SPRINGFIELD, ILLINOIS 62708-3227**

**PHONE: (217) 529-6601 FAX: (217) 529-6644**

## INTRODUCTION

This equipment will brew a half-gallon batch of coffee into an awaiting dispenser. It can be easily configured for 120V 15 amp, 120V 20 amp, 120/208V 20 amp or 120/240V 20 amp. The brewer has a hot water faucet for allied beverage use. It is only for indoor use on a sturdy counter or shelf.

## WARRANTY

Bunn-O-Matic Corp. ("Bunn") warrants the equipment manufactured by it to be commercially free from defects in material and workmanship existing at the time of manufacture and appearing within one year from the date of installation. In addition:

1.) Bunn warrants electronic circuit and/or control boards to be commercially free from defects in material and workmanship for two years from the date of installation.

2.) Bunn warrants the compressor on refrigeration equipment to be commercially free from defects in material and workmanship for two years from the date of installation.

3.) Bunn warrants that the grinding burrs on coffee grinding equipment will grind coffee to meet original factory screen sieve analysis for three years from date of installation or for 30,000 pounds of coffee, whichever comes first.

This warranty does not apply to any equipment, component or part that was not manufactured by Bunn or that, in Bunn's judgement, has been affected by misuse, neglect, alteration, improper installation or operation, improper maintenance or repair, damage or casualty.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY OTHER WARRANTY, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** The agents, dealers or employees of Bunn are not authorized to make modifications to this warranty or to make additional warranties that are binding on Bunn. Accordingly, statements by such individuals, whether oral or written, do not constitute warranties and should not be relied upon.

The Buyer shall give Bunn prompt notice of any claim to be made under this warranty by telephone at (217) 529-6601 or by writing to Post Office Box 3227, Springfield, Illinois, 62708-3227. If requested by Bunn, the Buyer shall ship the defective equipment prepaid to an authorized Bunn service location. If Bunn determines, in its sole discretion, that the equipment does not conform to the warranty, Bunn shall repair the equipment with no charge for parts during the warranty period and no charge for labor by a Bunn Authorized Service Representative during the warranty period. If Bunn determines that repair is not feasible, Bunn shall, at its sole option, replace the equipment or refund the purchase price for the equipment.

**THE BUYER'S REMEDY AGAINST BUNN FOR THE BREACH OF ANY OBLIGATION ARISING OUT OF THE SALE OF THIS EQUIPMENT, WHETHER DERIVED FROM WARRANTY OR OTHERWISE, SHALL BE LIMITED, AS SPECIFIED HEREIN, TO REPAIR OR, AT BUNN'S SOLE OPTION, REPLACEMENT OR REFUND.**

In no event shall Bunn be liable for any other damage or loss, including, but not limited to, lost profits, lost sales, loss of use of equipment, claims of Buyer's customers, cost of capital, cost of down time, cost of substitute equipment, facilities or services, or any other special, incidental or consequential damages.

## USER NOTICES

Carefully read and follow all notices in this manual and on the equipment. All labels on the equipment should be kept in good condition. Replace any unreadable or damaged labels.



**CAUTION**

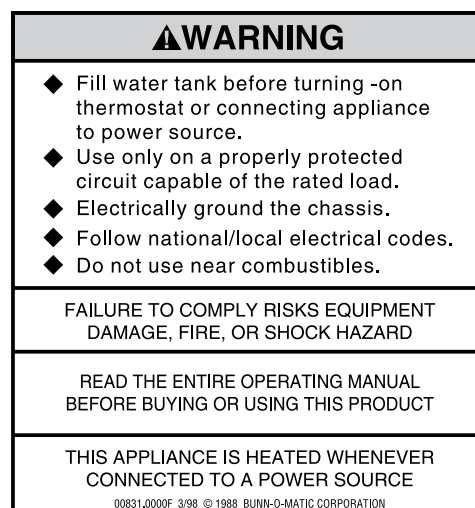
**WARMERS AND SURFACES ARE HOT**

#12364.0000

## USER NOTICES (CONT.)



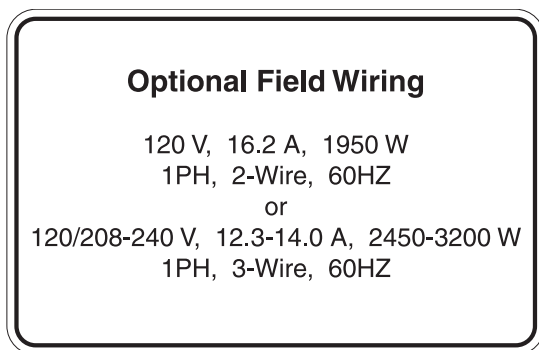
#00658.0000



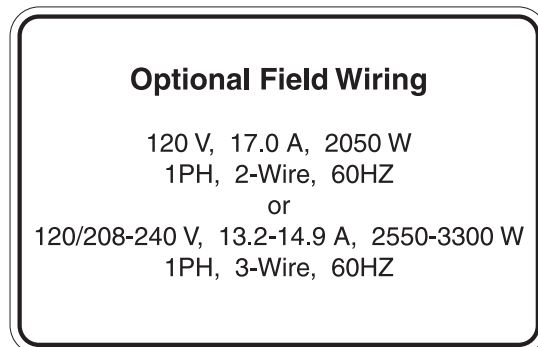
#00831.0000



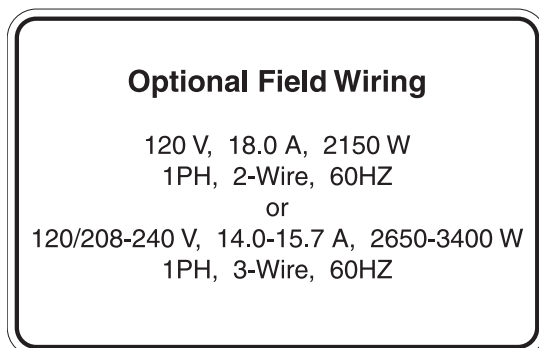
#02765.0000



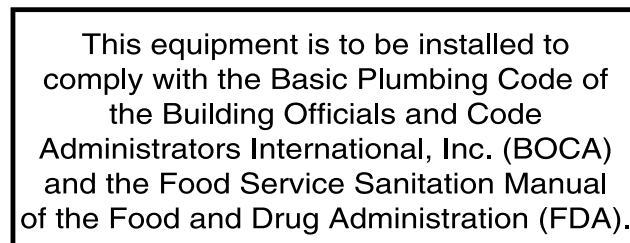
#28181.0001  
ONE WARMER BREWERS



#28181.0002  
TWO WARMER BREWERS ALSO CWAPS,  
CWTS & CWTSR



#28181.0000  
THREE WARMER BREWERS

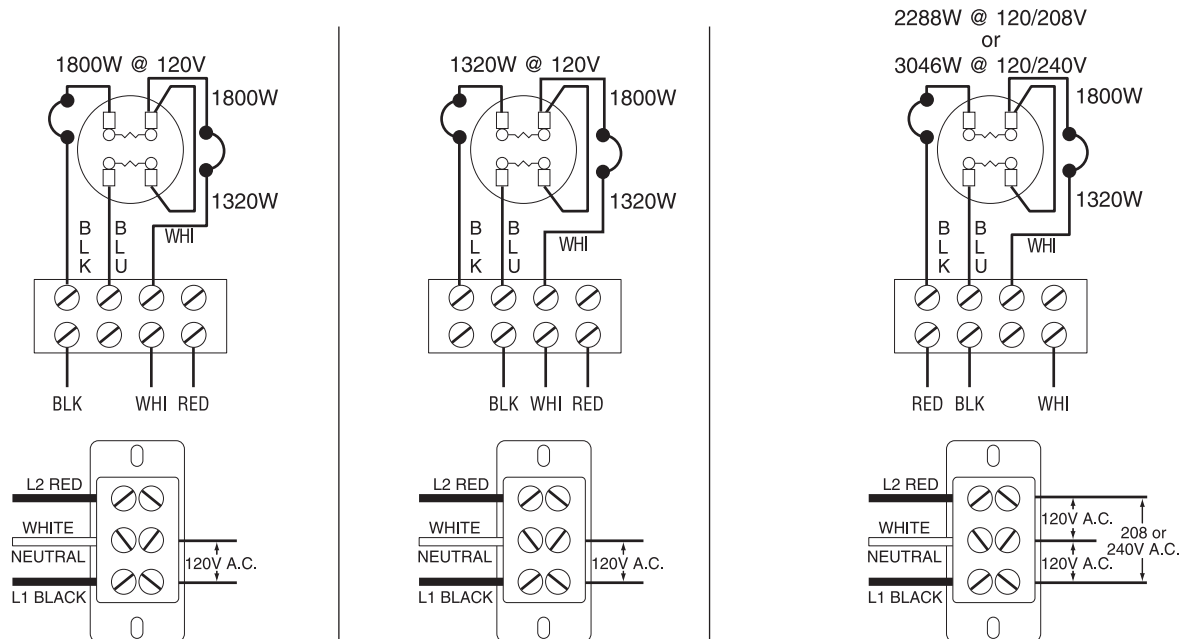


#00656.0000

## ELECTRICAL REQUIREMENTS

**CAUTION** - The brewer must be disconnected from the power source until specified in *Initial Set-Up*.

### TANK HEATER TERMINAL BLOCK WIRING DIAGRAM (C MODELS)



P1418

### FIELD WIRING TERMINAL BLOCK DIAGRAM

#### 1800W VERSION

Requires 2-wire, grounded service rated 120 volts ac, 20 amp, single phase, 60 Hz.

#### 1320W VERSION

Requires 2-wire, grounded service rated 120 volts ac, 15 amp, single phase, 60 Hz.

#### 2288W VERSION

Requires 3-wire, grounded service rated 120/208 volts ac, 20 amp, single phase, 60 Hz.

#### 3046W VERSION

Requires 3-wire, grounded service rated 120/240 volts ac, 20 amp, single phase, 60 Hz.

## ELECTRICAL HOOK-UP

**CAUTION** – Improper electrical installation will damage electronic components. This unit is factory wired for operation on a 120 volt, 15 amp service (1320W Version).

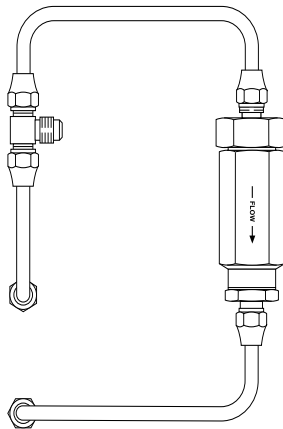
1. An electrician must provide electrical service and verify that the tank heater connections are connected as specified in the above diagram.
2. Determine the available on-site electrical service.
3. Select the desired unit wattage based on the available on-site electrical service.
4. Using a voltmeter, check the voltage and color coding of each conductor at the electrical source.
5. Place the heater switch at the rear of the brewer in the "OFF" (lower) position.
6. Remove the front panel beneath the sprayhead.
7. Feed the supply leads through the rear panel of the brewer.
8. Using the above diagrams, connect the desired electrical service to the field wiring terminal block and remove the top cover of the brewer to verify the tank heater terminal block connections.
9. The electrical service connections at the field wiring terminal block must agree with the tank heater terminal block connections as specified in the above diagram.
10. Before proceeding, verify the voltage at the field wiring terminal block. Replace the panel and top cover.
11. If plumbing is to be hooked up later be sure the brewer is disconnected from the power source. If plumbing has been hooked up, the brewer is ready for *Initial Set-Up*.

## PLUMBING REQUIREMENTS

These brewers must be connected to a cold water system with operating pressure between 20 and 90 psi (138 and 620 kPa) from a ½" or larger supply line. A shut-off valve should be installed in the line before the brewer. Install a regulator in the line when pressure is greater than 90 psi (620 kPa) to reduce it to 50 psi (345 kPa) . The water inlet fitting is ¼" flare.

**NOTE** - Bunn-O-Matic recommends ¼" copper tubing for installations of less than 25 feet and ⅜" for more than 25 feet from the ½" water supply line. A tight coil of copper tubing in the water line will facilitate moving the brewer to clean the countertop. Bunn-O-Matic does not recommend the use of a saddle valve to install the brewer. The size and shape of the hole made in the supply line by this type of device may restrict water flow.

**This equipment must be installed to comply with the Basic Plumbing Code of the Building Officials and Code Administrators International, Inc. (BOCA) and the Food Service Sanitation Manual of the Food and Drug Administration (FDA).**



1. Flush the water line and securely attach it to the tee.
2. Turn on the water supply.
3. Place an empty vessel beneath the faucet and lift the handle until water is dispensed.

## INITIAL SET-UP

**CAUTION** - The brewer must be disconnected from the power source throughout the initial set-up, except when specified in the instructions.

1. Insert an empty funnel into the funnel rails.
2. Place an empty dispenser under the funnel.
3. Place the heater switch at the rear of the brewer in the "OFF" (lower) position and connect the brewer to the power source.
4. Connect the brewer to the power source, place the "ON/OFF" switch in the "ON" (upper) position, and momentarily press and release the start switch. Water will begin flowing into the tank. When water stops flowing into the tank, initiate a second and a third brew cycle. During the third brew cycle the tank will fill to its capacity and the excess will flow from the sprayhead, out of the funnel, and into the dispenser.
5. When the flow of water from the funnel stops, place the heater switch at the rear of the brewer in the "ON" (upper) position and wait approximately twenty minutes for the water in the tank to heat to the proper temperature. Some water will drip from the funnel during this time; this is due to expansion and should not occur thereafter.
6. Empty the dispenser, place the "ON/OFF" switch in the "ON" (upper) position, and momentarily press and release the start switch.
7. Place the "ON/OFF" switch in the "OFF" (lower) position after water has stopped flowing from the funnel, and let the water in the tank reheat to the proper temperature.
8. Empty the dispenser, place the "ON/OFF" switch in the "ON" (upper) position, and momentarily press and release the start switch. Check the water volume in the dispenser after water has stopped flowing from the funnel. It should be 64 ounces.
9. If not, adjust the brew timer as required. See *Adjusting Brew Volumes*. Start, and measure another brew cycle.
10. Repeat step 9 until 64 oz water volume is achieved.
11. The brewer is now ready for use in accordance with the coffee brewing instructions.

## ADJUSTING BREW VOLUMES

**CAUTION** - Disconnect the power source from the brewer prior to the removal of any panel for the replacement or adjustment of any component.

**NOTE:** Prior to setting or modifying batch sizes, check that the brewer is connected to water supply, the tank is properly filled, and a funnel and dispenser are in place.

1. **Modifying batch sizes.** To modify a batch volume, first check that the SET/LOCK switch is in the "SET" position on the circuit board.

**To increase a batch size.** Press and hold the START or BREW switch until three clicks are heard. Release the switch (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory) and press it again one or more times. Each time the switch is pressed, two seconds are added to the brew time period. Allow the brew cycle to finish in order to verify that the desired volume has been achieved.

**To decrease a batch size.** Press and release the START or BREW switch once for every two-second interval to be removed from the total brew time period; then immediately press and hold down the START or BREW switch until three clicks are heard. Release the switch. (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory). Allow the brew cycle to finish in order to verify that the desired volume has been achieved.

## ADJUSTING BREW VOLUMES(cont.)

2. **Setting batch sizes.** To set a batch volume, first check that the SET/LOCK switch is in the "SET" position on the circuit board. Press and hold the START or BREW switch until three distinct clicks are heard, and then release the switch. (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory). View the level of the liquid being dispensed. When the desired level is reached, turn the ON/OFF switch to "OFF" (lower). The brewer remembers this volume and will continue to brew batches of this size until the volume setting procedure is repeated.

**NOTE:** When brewing coffee, batch volumes will decrease due to absorption by the coffee grounds.

3. **Setting programming disable feature.** If it becomes necessary to prevent anyone from changing brew times once programmed, you can set the SET/LOCK switch to the "LOCK" position. This will prevent any programming to be done until switch is once again placed in the "SET" position.

## OPERATING CONTROLS

### ON/OFF SWITCH

Placing the "ON/OFF" switch in the "OFF" (lower) position stops brewing. Stopping a brew cycle after it has been started will not stop the flow of water into the funnel until the tank syphons down to its proper level. Placing the switch in the "ON" (upper) position supplies power to enable the brew circuit on all brewers, and the brew station warmer on CWTF-MV Models.

### START SWITCH

Momentarily pressing and releasing the switch starts a brew cycle when the "ON/OFF" switch is in the "ON" (upper) position.

**NOTE –** The "ON/OFF" switch must be in the "ON" (upper) position to initiate and complete a brew cycle.

## COFFEE BREWING

1. Insert a BUNN® filter into the funnel.
2. Pour the fresh coffee into the filter and level the bed of grounds by gently shaking.
3. Slide the funnel into the funnel rails.
4. Place an empty dispenser beneath the funnel.
5. Place the "ON/OFF" switch in the "ON" (upper) position. Momentarily press and release the start switch.
6. When brewing is completed, simply discard the grounds and filter.

## CLEANING

1. The use of a damp cloth rinsed in any mild, non-abrasive, liquid detergent is recommended for cleaning all surfaces on Bunn-O-Matic equipment.
2. Check and clean the sprayhead. The sprayhead holes must always remain open.
3. With the sprayhead removed, insert the deliming spring (provided) all the way into the sprayhead tube. When inserted properly, no more than two inches of spring should be visible. Saw back and forth five or six times.

**NOTE –** In hard water areas, this may need to be done daily. It will help prevent liming problems in the brewer and takes less than a minute.



## TROUBLESHOOTING

A troubleshooting guide is provided to suggest probable causes and remedies for the most likely problems encountered. If the problem remains after exhausting the troubleshooting steps, contact the Bunn-O-Matic Technical Service Department.

- Inspection, testing, and repair of electrical equipment should be performed only by qualified service personnel.
- All electronic components have 120 volt ac and low voltage dc potential on their terminals. Shorting of terminals or the application of external voltages may result in board failure.
- Intermittent operation of electronic circuit boards is unlikely. Board failure will normally be permanent. If an intermittent condition is encountered, the cause will likely be a switch contact or a loose connection at a terminal or crimp.
- Solenoid removal requires interrupting the water supply to the valve. Damage may result if solenoids are energized for more than ten minutes without a supply of water.
- The use of two wrenches is recommended whenever plumbing fittings are tightened or loosened. This will help to avoid twists and kinks in the tubing.
- Make certain that all plumbing connections are sealed and electrical connections tight and isolated.
- This brewer is heated at all times. Keep away from combustibles.

### WARNING

- Exercise extreme caution when servicing electrical equipment.
- Unplug the brewer when servicing, except when electrical tests are specified.
- Follow recommended service procedures
- Replace all protective shields or safety notices

### PROBLEM

### PROBABLE CAUSE

### REMEDY

Brew cycle will not start

1. No water

Water lines and valves to the brewer must be open.

2. No power or incorrect voltage to the brewer

(A1) Check the terminal block for 120 volts across the black and white terminals on two wire 120 volt brewers.

(A2) Check the terminal block for 120 volts ac across the red and white and the black and white terminals on 120/208V and 120/240V volt brewers.

(B) Check circuit breakers or fuses.

3. ON/OFF Switch

Refer to *Service* - ON/OFF Switch for testing. See page 18

4. Start Switch

Refer to *Service* - Start Switch for testing procedures. See page 20



## TROUBLESHOOTING (cont.)

### PROBLEM

### PROBABLE CAUSE

### REMEDY

Brew cycle will not start (cont.)

5. Timer

Refer to *Service* - Timer for testing procedures. See page 26 or 27

6. Solenoid Valve

Refer to *Service* - Solenoid Valve for testing procedures. See page 19

7. Water strainer/flow control  
(.222 GPM)

(A) Direction of flow arrow must be pointing towards brewer.

(B) Remove the strainer/flow control and check for obstructions. Clear or replace.

Water is not hot

1. Tank Heater Switch

Refer to *Service* - Tank Heater Switch for testing procedures. See page 23

2. Limit Thermostat

**CAUTION** - Do not eliminate or bypass limit thermostat. Use only replacement part #29329.1000

Refer to *Service* - Limit Thermostat for testing procedures. See page 17

3. Control Thermostat

Refer to *Service* - Control Thermostat for testing procedures. See page 15

4. Tank Heater(s)

Refer to *Service* - Tank Heater(s) for testing procedures. See page 21

5. Fuse Holder and Fuse Assembly

Refer to *Service* - Fuse Holder and Fuse Assembly for testing procedures. See page 16

6. Thermal Fuse

Refer to *Service* - Thermal Fuse for testing procedures. See page 25

## TROUBLESHOOTING (cont.)

### PROBLEM

### PROBABLE CAUSE

### REMEDY

Inconsistent beverage level in dispenser

1. Strainer/flow control (.222 GPM)

(A) Direction of flow arrow must be pointing towards the brewer.

(B) Remove the strainer/flow control and check for obstruction. Clear or replace.

2. Syphon System

The brewer must be level or slightly lower in front to syphon properly.

3. Lime Build-up

**CAUTION** - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.

Inspect the tank assembly for excessive lime deposits. Delime as required.

4. Water Pressure

The water pressure to the brewer must be at least 20 psi (138 kPa).

Consistently low beverage level in the dispenser

1. Timer

Refer to *Service* - Timer for adjusting procedures. See page 26 or 27

2. Strainer/flow Control (.222 GPM)

(A) Direction of flow arrow must be pointing towards brewer.

(B) Remove the strainer/flow control and check for obstructions. Clear or replace.

Spitting or excessive steaming

1. Lime Build-up

**CAUTION** - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.

Inspect tank assembly for excessive lime deposits. Delime as required.

## TROUBLESHOOTING (cont.)

PROBLEM	PROBABLE CAUSE	REMEDY
Spitting or excessive steaming (cont.)	2. Control Thermostat	Refer to <i>Service</i> - Control Thermostat for testing procedures. See page 15
Dripping from sprayhead	1. Syphon System	The brewer must be level or slightly lower in front to syphon properly.
	2. Lime Build-up <b>CAUTION</b> - Tank and tank components should be delimed regularly depending on local water conditions. Excessive mineral build-up on stainless steel surfaces can initiate corrosive reactions resulting in serious leaks.	Inspect the tank assembly for excessive lime deposits. Delime as required.
	3. Solenoid Valve	Remove the solenoid valve and clear any obstructions. Rebuild or replace the valve if necessary. See page 19
Water flows into tank continuously (ON/OFF Switch "ON")	1. Timer	Refer to <i>Service</i> - Timer for testing procedures. See page 26 or 27
Water flows into tank continuously (ON/OFF Switch "OFF")	1. Solenoid Valve	Remove the Solenoid Valve and clean any obstruction. Rebuild or replace the valve if necessary. See page 19
Beverage overflows dispenser	1. Dispenser	The dispenser must be completely empty before starting a brew cycle.
	2. Timer	Refer to <i>Service</i> - Timer for testing procedures. See page 26 or 27
	3. Solenoid Valve	Remove the Solenoid Valve and clean any obstruction. Rebuild or replace the valve if necessary. See page 19

## TROUBLESHOOTING (cont.)

### PROBLEM

### PROBABLE CAUSE

### REMEDY

Weak beverage

1. Filter Type

BUNN® paper filters must be used for proper extraction.

2. Coffee Grind

A fine or drip grind must be used for proper extraction.

3. Sprayhead

A six-hole stainless steel sprayhead must be used for proper extraction.

4. Funnel Loading

The BUNN® paper filter must be centered in the funnel and the bed of ground leveled by gentle shaking.

5. Water Temperature

Place an empty funnel on an empty dispenser beneath the sprayhead. Initiate a brew cycle and check the water temperature immediately below the sprayhead with a thermometer. The reading should not be less than 195°F(91°C). Adjust the control thermostat to increase the water temperature. Replace if necessary.

Dry coffee grounds remain in the funnel

1. Funnel Loading

The BUNN® paper filter must be centered in the funnel and the bed of grounds leveled by gently shaking.

Brewer is making unusual noises

1. Solenoid

The nut on the solenoid must be tight or it will vibrate during operation.

2. Plumbing Lines

Plumbing lines should not be resting on the counter top.

3. Water Supply

(A) The brewer must be connected to a cold water line.

(B) Water pressure to the brewer must not exceed 90 psi (620 kPa). Install a regulator if necessary to lower the working pressure to approximately 50 psi (345 kPa).

## **TROUBLESHOOTING (cont.)**

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Brewer is making unusual noises (cont.)	4. Tank Heater(s)	Remove and clean lime off the tank heater(s). See page 21
Low beverage serving temperature (CWTF Only)	1. Warmer	Refer to <i>Service</i> - Warmer element for testing procedures. See page 29

## SERVICE

This section provides procedures for testing and replacing various major components used in this brewer should service become necessary. Refer to *Troubleshooting* for assistance in determining the cause of any problem.

**WARNING** - Inspection, testing, and repair of electrical equipment should be performed only by qualified service personnel. The brewer should be unplugged when servicing, except when electrical tests are required and the test procedure specifically states to plug in the brewer.

**NOTE:** All illustrations in the service section of this manual are of a CWTF Model except where specified.

### COMPONENT ACCESS

**WARNING** - Disconnect the brewer from the power source before the removal of any panel or the replacement of any component.

All components are accessible by the removal of the top cover, front inspection panel and warmer plate(s).

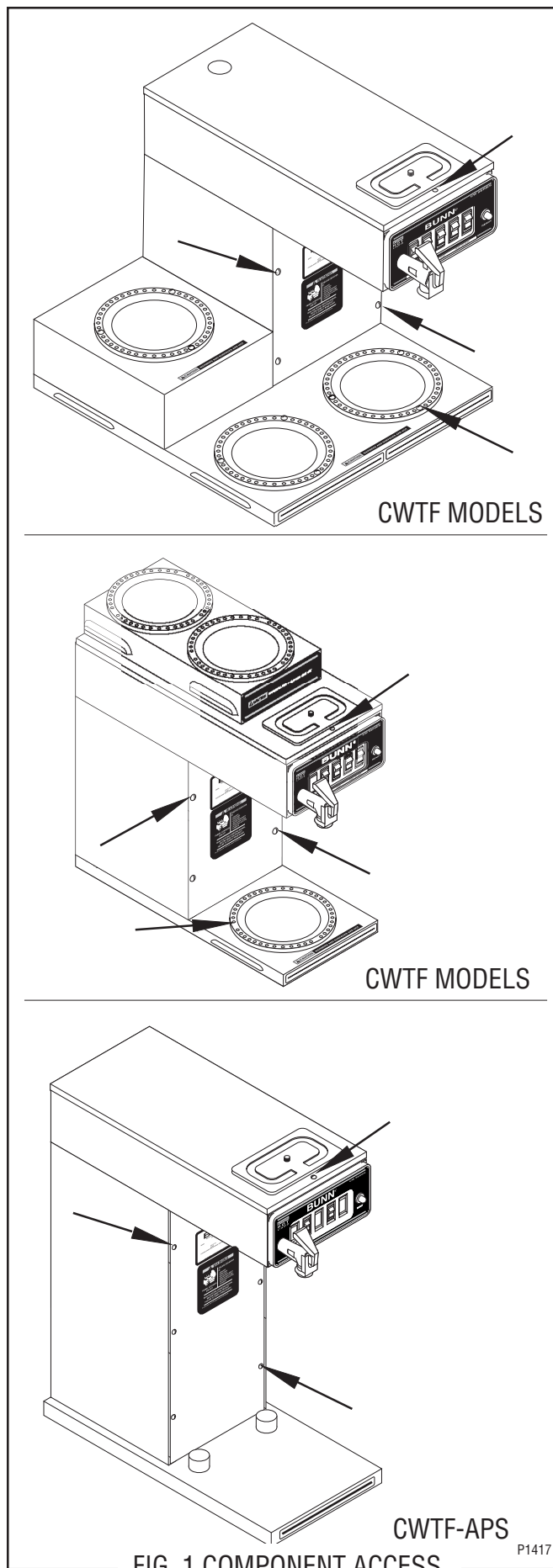
The top cover is attached with one #4-40 screw.

The front inspection panel is attached with four #6-32 screws on CWTF Models, six #6-32 screws on CWTF-APS, TS Models and eight #6-32 screws on CWTF-TSR Models.

The warmer assembly (CWTF Models) is attached with three #4-40 screws.

### Contents

Control Thermostat .....	15
Fuse Holder and Fuse Assembly .....	16
Limit Thermostat .....	17
ON/OFF Switch .....	18
Solenoid Valve (Inlet) .....	19
Start Switch (Brew) .....	20
Tank Heater(s) .....	21
Tank Heater Switch .....	23
Thermal Fuse .....	25
Timer (Early Models) .....	26
Digital Timer (Late Models) .....	27
Warmer Element (CWTF Models Only) .....	29
Wiring Diagrams .....	30



## SERVICE (cont.)

### CONTROL THERMOSTAT

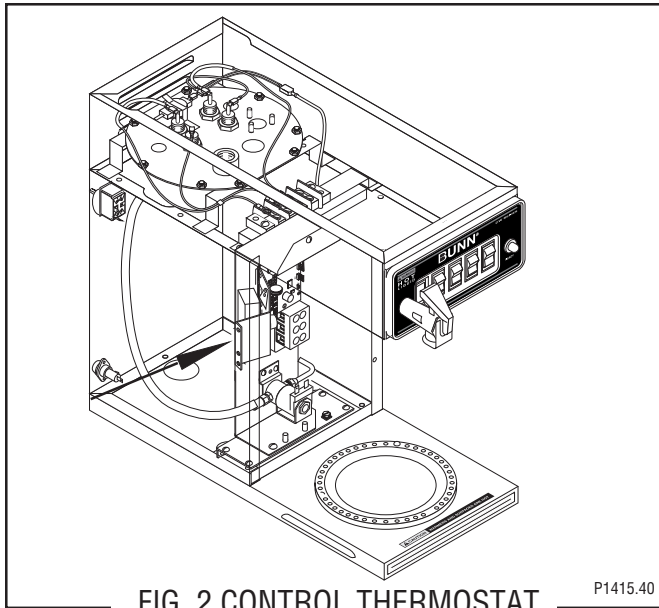


FIG. 2 CONTROL THERMOSTAT

#### Location:

The control thermostat is located inside the trunk on the upper left side of the component bracket.

#### Test Procedures:

1. Disconnect the brewer from the power source.
2. Locate the blue wire on the control thermostat.
3. With a voltmeter, check the voltage across the blue wire on the control thermostat and the white insert on two wire 120 volt, three wire 120/208 volt or 120/240 volt terminal block. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt models or 120/240 volt models.
4. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #5.

If voltage is not present as described, refer to the *Wiring Diagrams* and check the brewer wiring harness.

5. Locate the black wire on the control thermostat.
6. Gently remove the capillary bulb and grommet from the tank.
7. With a voltmeter, check the voltage across the black wire of the control thermostat and the white insert on two wire 120 volt model, three wire 120/208 volt model or three wire 120/240 volt model terminal blocks when the control thermostat is turned fully clockwise. Connect the brewer to the power source. The indication must be:

- a) 120 volts ac for two wire 120 volt models.
- b) 120 volts ac for three wire 120/208 volt models or 120/240 volt models.

8. Disconnect the brewer from the power source.

If voltage is present as described, reinstall the capillary tube into the tank to the line 4.5" above the bulb, the control thermostat is operating properly.

If voltage is not present as described, replace the thermostat.

#### Removal and Replacement:

1. Remove wires from control thermostat.
  2. Remove the thermostat capillary bulb by firmly pulling up on the capillary at the tank lid. This will disengage the grommet from the tank lid.
  3. Remove the one #8-32 screw securing the control thermostat to the component bracket in the trunk.
  4. Slide the grommet to the line 4.5" above the bulb on the new capillary tube.
  5. Insert the capillary bulb through the hole in the tank lid and press the grommet firmly and evenly so that the groove in the grommet fits into the tank lid.
  6. Carefully bend the capillary tube so that the tube and bulb inside the tank are in the vertical position.
- NOTE** - The capillary tube must be clear of any electrical termination and not kinked.
7. Using one #8-32 screw secure the control thermostat to the upper left side of the component bracket inside the trunk.
  8. Refer to Fig. 3 when reconnecting the wires.
  9. Adjust the control thermostat as required.

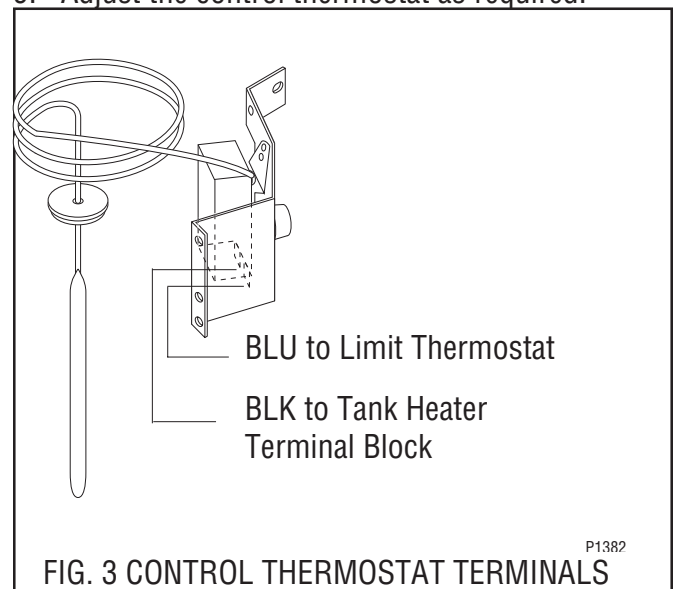
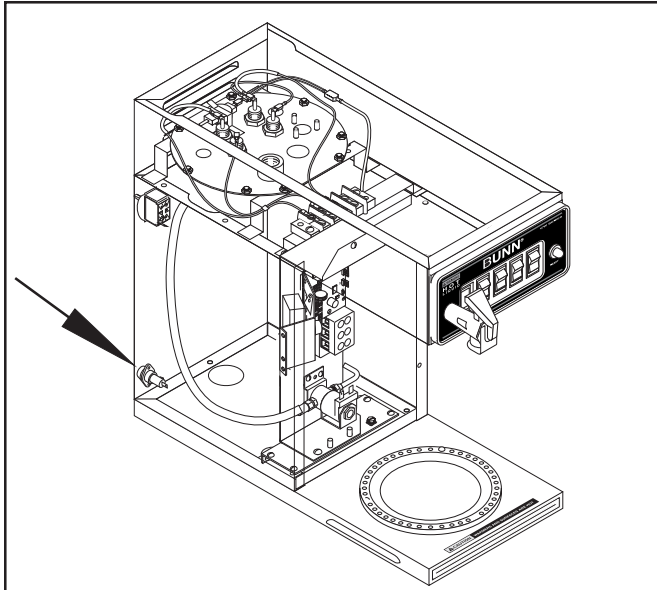


FIG. 3 CONTROL THERMOSTAT TERMINALS



## SERVICE (cont.)

### FUSE HOLDER AND FUSE ASSEMBLY



P1415

FIG. 4 FUSE HOLDER AND FUSE ASSEMBLY

#### Location:

The fuse holder and fuse assembly is located on the left rear side of the brewer.

#### Test Procedures:

1. Disconnect the brewer from the power source.
2. Remove the cap from the fuse holder and remove the fuse.
3. With an ohmmeter, check for continuity through the fuse.

If continuity is present as described, reinstall the fuse, the fuse is operating properly.

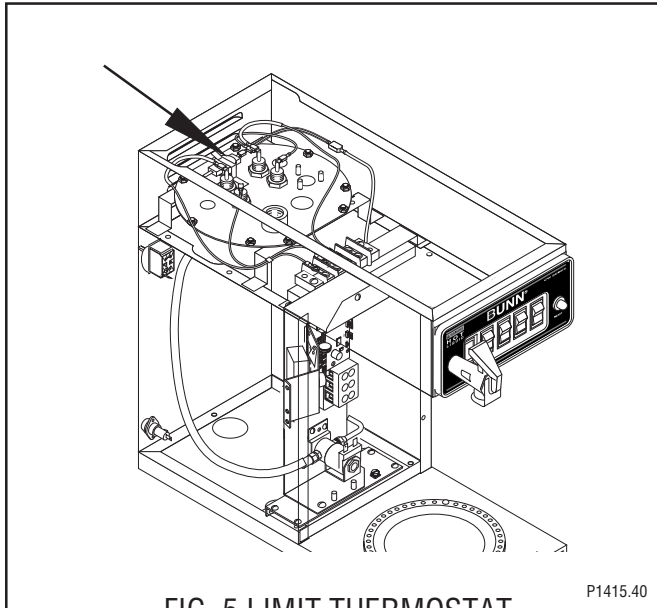
If continuity is not present as described, replace the fuse.

#### Removal and Replacement:

1. Remove the cap from the holder.
2. Remove fuse from the fuse holder and discard.
3. Install new 20 amp fuse in the holder.
4. Reinstall fuse holder cap.

## SERVICE (cont.)

### LIMIT THERMOSTAT



#### Location:

The limit thermostat is located inside the rear of the hood on the center rear of the tank lid.

#### Test Procedures:

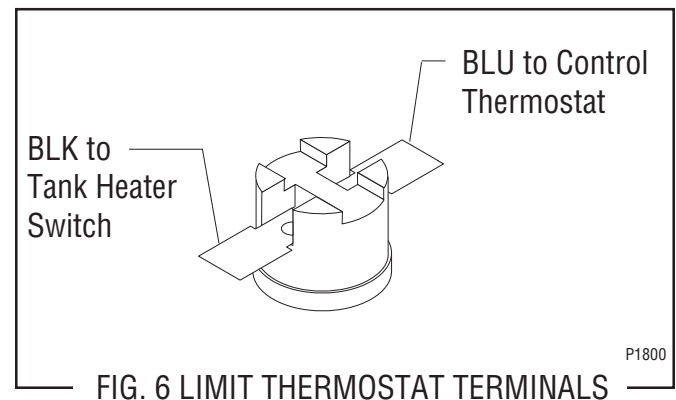
1. Disconnect the brewer from the power source.
2. Disconnect the blue and black wires from the limit thermostat.
3. With an ohmmeter, check for continuity across the limit thermostat terminals.

If continuity is present as described, the limit thermostat is operating properly.

If continuity is not present as described, replace the limit thermostat.

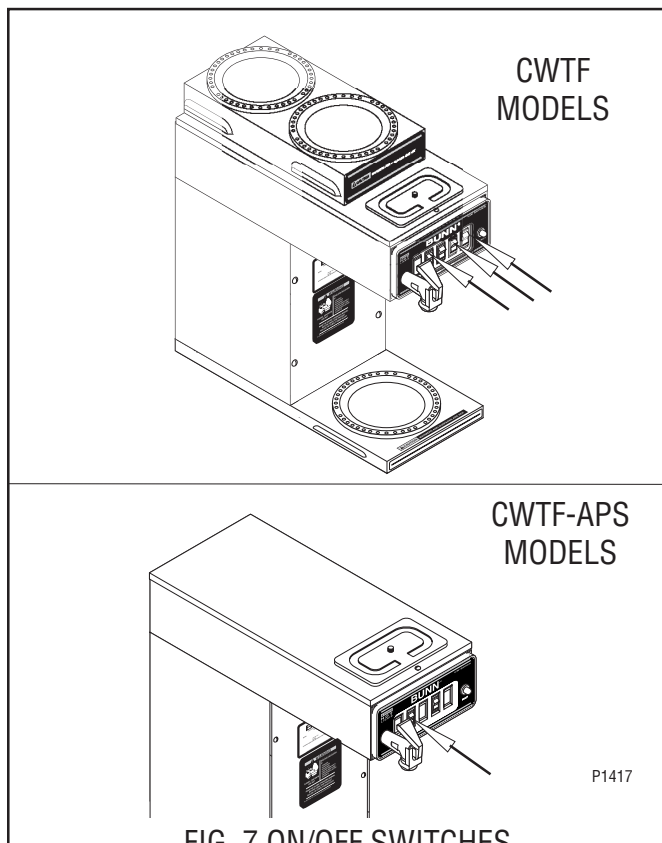
#### Removal and Replacement:

1. Remove all wires from limit thermostat terminals.
2. Carefully slide the limit thermostat out from under the retaining clip and remove limit thermostat.
3. Carefully slide the new limit thermostat into the retaining clip.
4. Refer to Fig. 6 when reconnecting the wires.



## SERVICE (cont.)

### ON/OFF SWITCHES



#### Location:

The ON/OFF switches are located on the front of the hood.

#### Test Procedure:

1. Disconnect the brewer from the power source.
2. Viewing the switch from the back remove the white wire from the upper terminal and the black wire from the center terminal.
3. With a voltmeter, check the voltage across the white wire and the black wire. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt or 120/240 volt models.
4. Disconnect the brewer from the power source.

If voltage is present as described, reconnect the white wire and proceed to #5.

If voltage is not present as described, refer to the *Wiring Diagram* and check the brewer wiring harness.

5. With the black wire removed, remove the wire from the lower terminal.

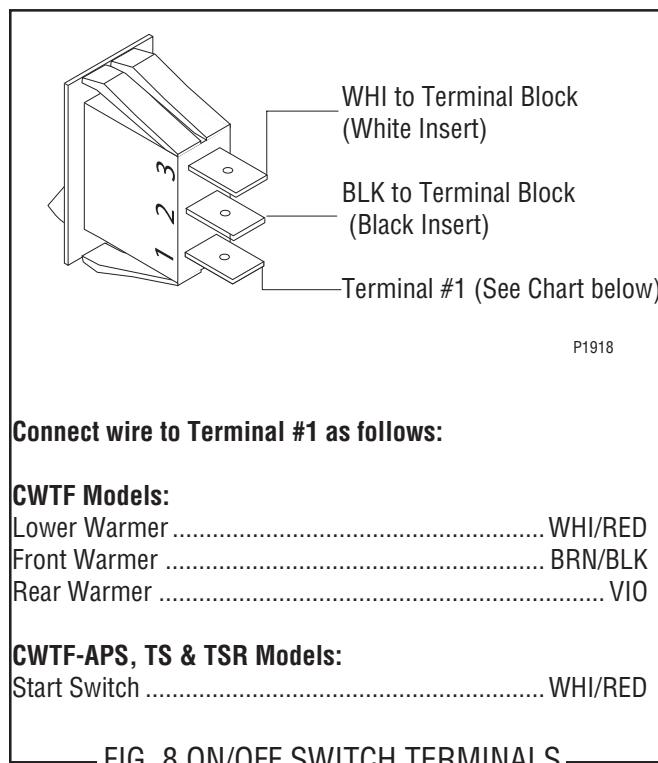
6. Check for continuity across the center and lower terminal with the switch in the "ON" (upper) position. Continuity must not be present when the switch is in the "OFF" (lower) position.

If continuity is present as described, reconnect the black wire to the center terminal and the remaining wire to the lower terminal.

If continuity is not present as described, replace the switch.

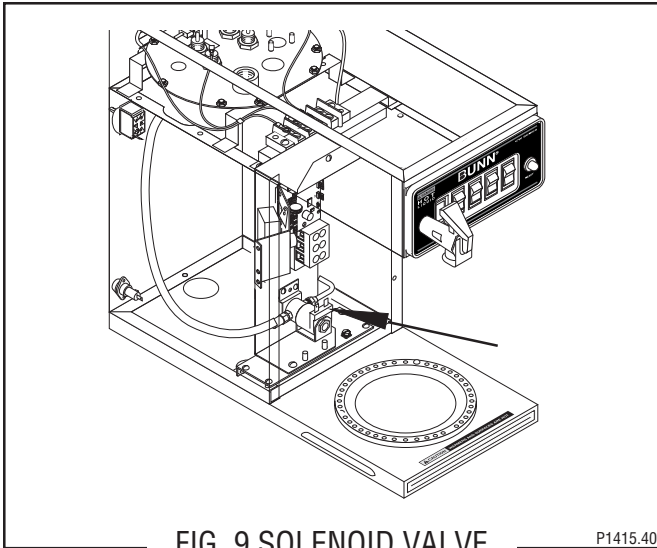
#### Removal and Replacement:

1. Remove the wires from the switch terminals.
2. Turn off water supply and remove faucet.
3. Remove front end cap.
4. Compress the clips inside the hood and gently push the switch through the opening.
5. Push the new switch into the opening and spread the clips to hold switch in the hood.
6. Reinstall front end cap.
7. Reinstall faucet and connect brewer to the water supply.
8. Refer to Fig. 8 when reconnecting the wires.



## SERVICE (cont.)

### SOLENOID VALVE



#### Location:

The solenoid valve is located inside the trunk on the lower center part of the component bracket.

#### Test Procedures:

1. Disconnect the brewer from the power source.
2. Disconnect both wires from the solenoid valve. Connect the brewer to the power source. With the lower warmer "ON/OFF" switch in the "ON" (upper) position press the start switch.
3. With a voltmeter, check the voltage across the two wires. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt and 120/240 volt models.
4. Disconnect the brewer from the power source

If voltage is present as described, proceed to #5

If voltage is not present as described, refer to *Wiring Diagrams* and check brewer wiring harness.

5. Check for continuity across the solenoid valve coil terminals.

If continuity is present as described, reconnect the wires from the timer.

If continuity is not present as described, replace the solenoid valve

6. Check the solenoid valve for coil action. Connect the brewer to the power source. With "ON/OFF" switch in the "ON" (upper) position press start switch and listen carefully in the vicinity of the solenoid valve for a "clicking" sound as the coil magnet attracts.

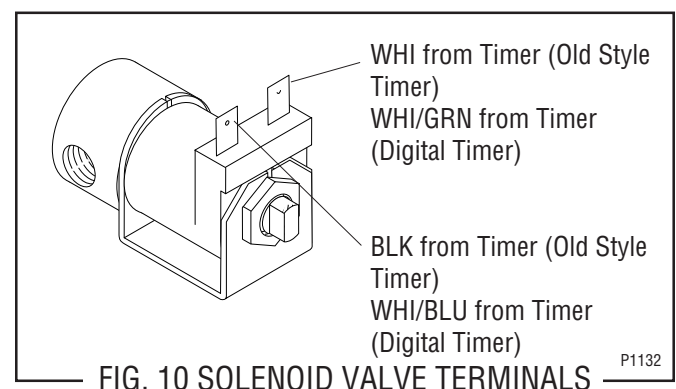
7. Disconnect the brewer from the power source.

If the sound is heard as described and water will not pass through the solenoid valve, there may be a blockage in the water line before the solenoid valve, or the solenoid valve may require inspection for wear, and removal of waterborne particles.

If the sound is not heard as described, replace the solenoid valve.

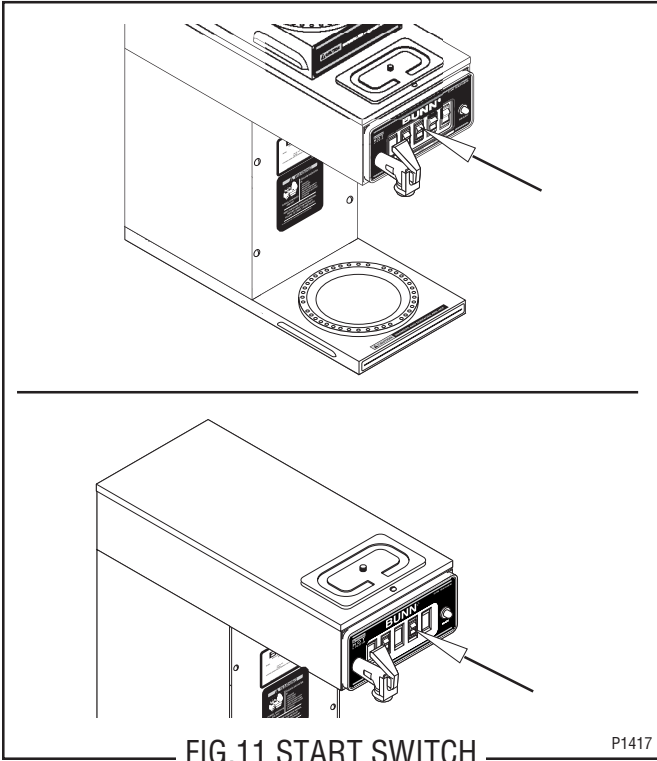
#### Removal and Replacement:

1. Remove all wires from the solenoid valve.
2. Turn off the water supply to the brewer.
3. Disconnect the water lines to and from the solenoid valve.
4. Remove the two #8-32 screws securing the solenoid mounting bracket to the component bracket. Remove solenoid bracket and solenoid valve as an assembly.
5. Remove the two #10-32 screws and lockwashers securing the solenoid valve to the solenoid bracket.
6. Using two #10-32 screws and lockwashers install new solenoid valve on solenoid mounting bracket.
7. Using two #8-32 screws install solenoid valve and bracket to the component bracket.
8. Securely fasten the water lines to and from the solenoid valve.
9. Refer to Fig. 10 when reconnecting the wires.



## SERVICE (cont.)

### START SWITCH



#### Location:

The start switch is located on the front of the hood in the center of switch panel.

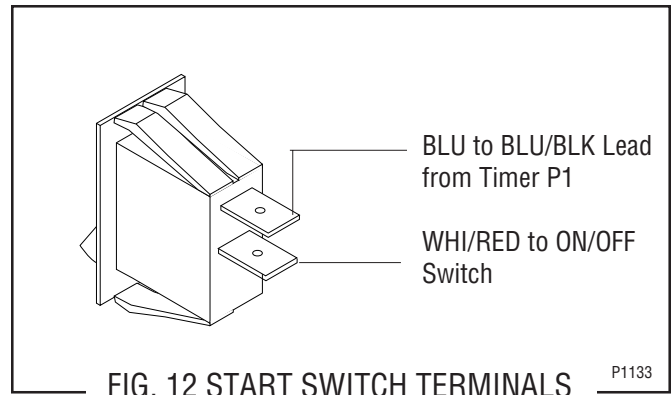
#### Test Procedure:

1. Disconnect the brewer from the power supply.
2. Disconnect the blue wire from the top switch terminal and the white/red wire from the bottom switch terminal.
3. Check for continuity across the two terminals on the switch when it is held in the lower position. Continuity must not be present across these terminals in the upper position.

If continuity is present as described, reconnect the blue wire to the top terminal and the white/red wire to the bottom terminal. The switch is operating properly. If continuity is not present as described, replace the switch.

#### Removal and Replacement:

1. Remove the blue wire and white/red wire from the start switch.
2. Turn off the water supply and remove faucet.
3. Remove front end cap.
4. Compress the clips inside the hood and gently push the switch through the opening.
5. Push new switch into the opening and spread the clips to hold the start switch in the hood.
6. Reinstall front end cap.
7. Reinstall faucet and reconnect the brewer to the water supply.
8. Refer to Fig. 12 when reconnecting the wires.



## SERVICE (cont.)

### TANK HEATERS

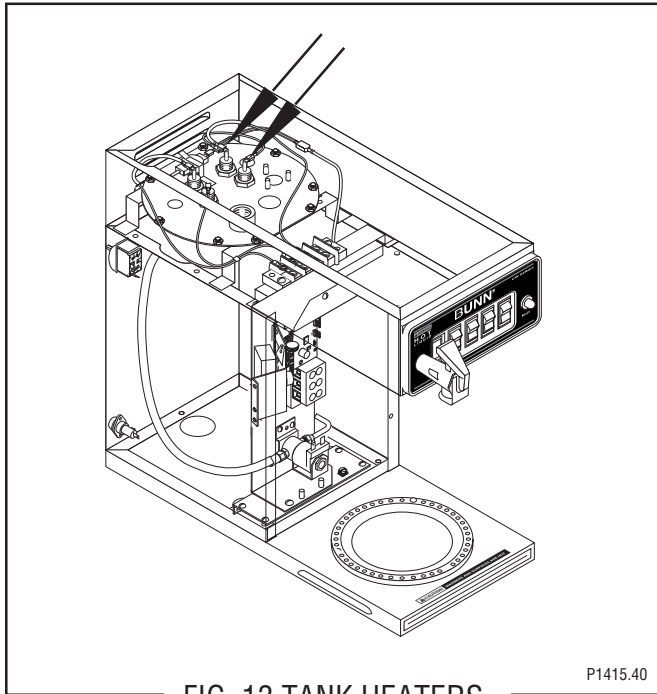


FIG. 13 TANK HEATERS

#### Location:

The tank heaters are located inside the tank and secured to the tank lid.

#### Test Procedures:

1. Disconnect the brewer from the power supply.
2. With a voltmeter, check the tank heater voltage across blue and white wires on 120 volt 15 amp version, black and white wires on 120 volt 20 amp version or black and blue wires on 120/208 volt or 120/240 volt version at the tank heater terminal block. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt 15 and 20 amp models.
  - b) 208 volts ac for three wire 120/208 volt models.
  - c) 240 volts ac for three wire 120/240 volt models.
3. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #4  
If voltage is not present as described, refer to the *Wiring Diagrams* and check wiring harness.

4. Disconnect the black, blue and white leads from the terminals of each tank heater.
5. Check for continuity across the terminals of each tank heater.

If continuity is present as described, reconnect the wires, the tank heaters are operating properly.  
If continuity is not present as described, replace the open tank heater.

**NOTE-** If the tank heater(s) remain unable to heat, remove and inspect heater(s) for cracks in the sheath.

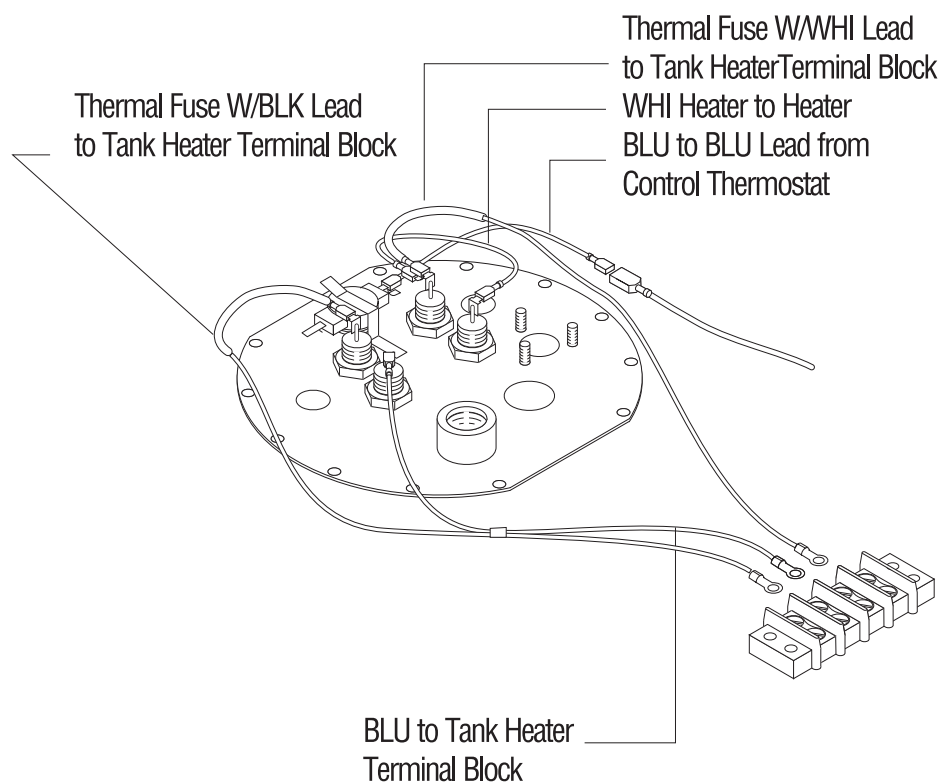
#### Removal and Replacement:

1. Disconnect the water supply tube from the fill basin.
2. Remove the tank inlet fitting securing the fill basin to the tank lid, remove fill basin, splash guard and tank inlet gasket. Set all parts aside for reassembly.
3. Turn off water supply to the brewer and disconnect the inlet and outlet water lines to the faucet coil assembly.
4. Disconnect the black wire on the limit thermostat from the tank heater switch. Disconnect the blue wire from the limit thermostat to the control thermostat.
5. Disconnect the black, white and blue wires from the tank heater terminals.
6. Remove sprayhead and the hex nut securing the sprayhead tube to the hood. Set aside for reassembly.
7. Remove the eight #8-32 nuts securing the tank lid to the tank.
8. Remove the tank lid with limit thermostat, sprayhead, tank heaters and coil assembly.
9. Remove the two hex nuts securing each tank heater to the tank lid. Remove tank heater(s) with gaskets and discard.
10. Install new tank heater(s) with gaskets on the tank lid and secure with two hex nuts.
11. Install tank lid with limit thermostat, sprayhead tube, tank heaters, coil assembly using eight #8-32 hex nut.
12. Reconnect the inlet and outlet water lines to the faucet coil assembly.
13. Secure sprayhead tube to hood using a hex nut.
14. Install sprayhead.
15. Reconnect the wires to the limit thermostat and tank heaters and control thermostat. See *Limit Thermostat* and *Control Thermostat* sections in this manual when reconnecting wires.
16. Install fill basin, secure with tank inlet fitting and gasket. Insert water supply line through grommet in fill basin.

## SERVICE (cont.)

### TANK HEATERS (cont.)

17. Refer to Fig.14 when reconnecting the tank heater wires.



#### TANK HEATER TERMINAL BLOCK WIRING DIAGRAM (C MODELS)

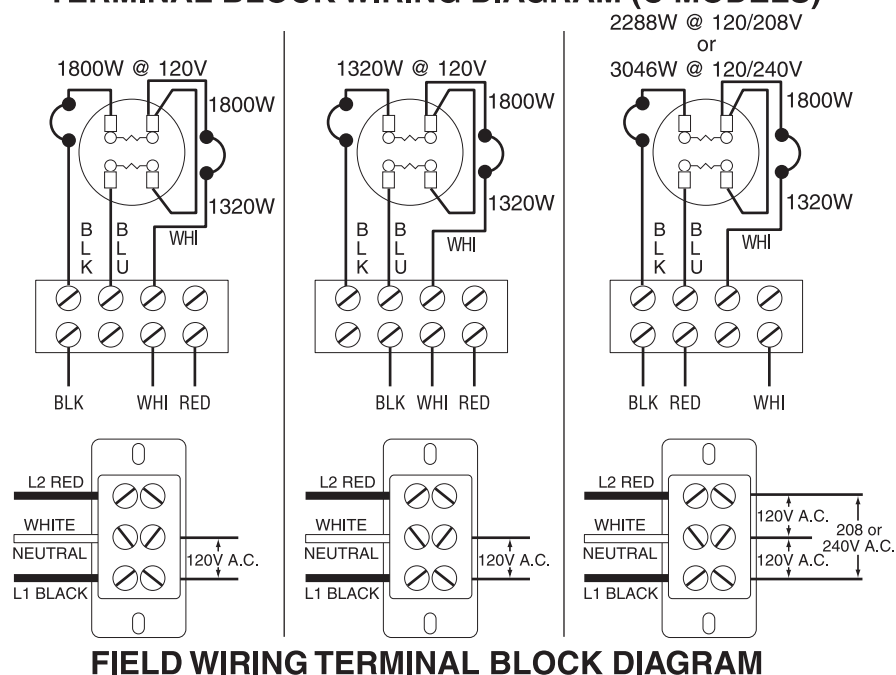


FIG. 14 TANK HEATER TERMINALS

P1420



## SERVICE (cont.)

### TANK HEATER SWITCH

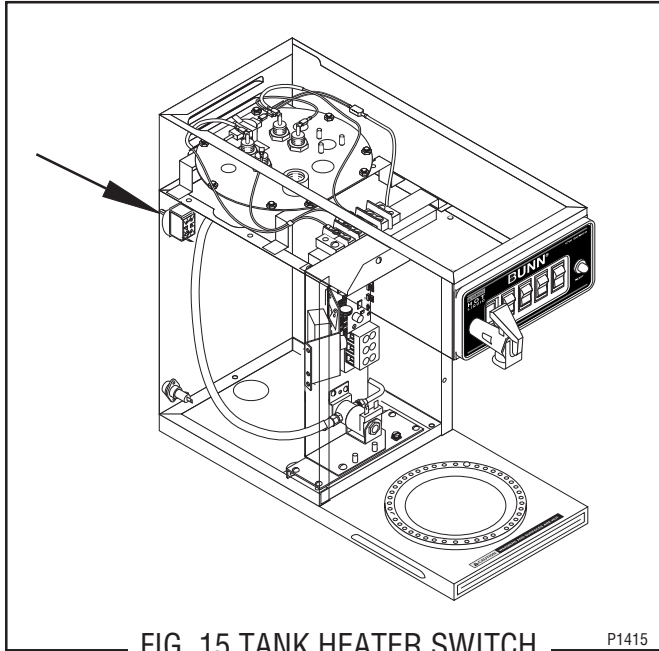


FIG. 15 TANK HEATER SWITCH

P1415

#### Location:

The tank heater switch is located on the rear of the brewer on the upper left side of the trunk.

#### Test Procedure:

1. Disconnect the brewer from the power source.
2. Disconnect the black wire from the limit thermostat.
3. With a voltmeter, check the voltage between the black wire removed from the limit thermostat and the white wire on the tank heater, with the tank heater switch in the "ON" (upper) position. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac on two wire 120 volt models.
  - b) 208 volts ac on three wire 120/208 volt models.
  - c) 240 volts ac on three wire 120/240 volt models.
4. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #5.

If voltage is not present as described, refer to the *Wiring Diagrams* and check the brewer wiring harness.

5. Check for continuity between the black wire removed from the limit thermostat and the black insert on the terminal block, with the tank heater switch in the "ON" (upper) position. Continuity should not be present in the "OFF" (lower) position.

If continuity is present as described, the tank heater switch is operating properly.

If continuity is not present as described, replace the tank heater switch.

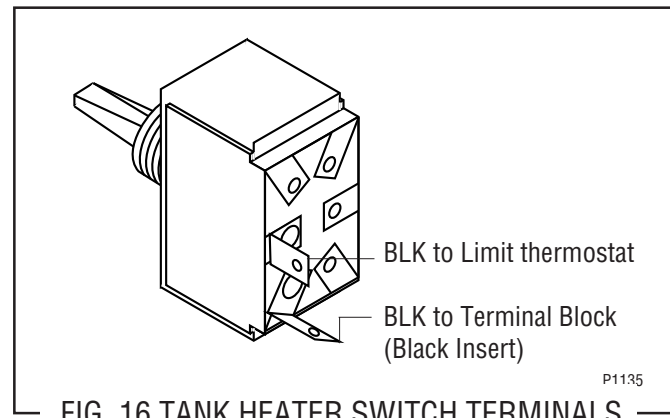
#### Removal and Replacement:

1. Turn off and disconnect the incoming water supply to the brewer.
2. Gently remove the fill tube from back of fill basin.
3. Remove the tank inlet fitting securing fill basin to the tank lid. Remove fill basin and gasket. Set all three parts aside for reassembly.
4. Disconnect the water supply to coil assembly and remove the tube from the tank to the faucet.
5. Remove sprayhead and hex nut securing sprayhead tube to the hood. Set aside for reassembly.
6. Disconnect the wires on the limit thermostat and the tank heaters.
7. Gently pull the thermostat sensor and grommet from the tank lid.
8. Insert a tube to the bottom of the tank and syphon ALL of the water out.
9. Gently reinstall the thermostat sensor and grommet in the tank lid.
10. Remove the two #8-32 screws securing the tank assembly to the hood.
11. Lift tank and components out as an assembly and set aside for reassembly.
12. Disconnect the two black wires from the tank heater switch.
13. Remove the plastic facenut, hex facenut and the switch indicator/guard bracket that secures tank heater switch to the rear of the brewer. Remove switch and discard.
14. Insert new tank heater switch through the hole in the upper left rear of the trunk and secure with switch indicator/guard bracket, hex facenut and plastic facenut.

## SERVICE (cont.)

### TANK HEATER SWITCH (cont.)

15. Reconnect the two black wires to the tank heater switch terminals.
16. Set tank assembly inside the hood on mounting brackets and secure with two #8-32 screws.
17. Reconnect the wires to the limit thermostat and tank heaters. Refer to *Limit Thermostat* and *Tank Heater* sections in this manual when reconnecting wires.
18. Reinstall the faucet tube and reconnect the water supply tube to the coil assembly.
19. Secure the sprayhead tube to the hood using hex nut.
20. Install sprayhead.
21. Install fill basin, inlet gasket and secure to tank lid with tank inlet fitting.
22. Carefully install water fill tube into the back of the fill basin.
23. Reconnect and turn on the incoming water supply.
24. Refer to Fig. 16 when reconnecting the wires.



## SERVICE (cont.)

### THERMAL FUSES

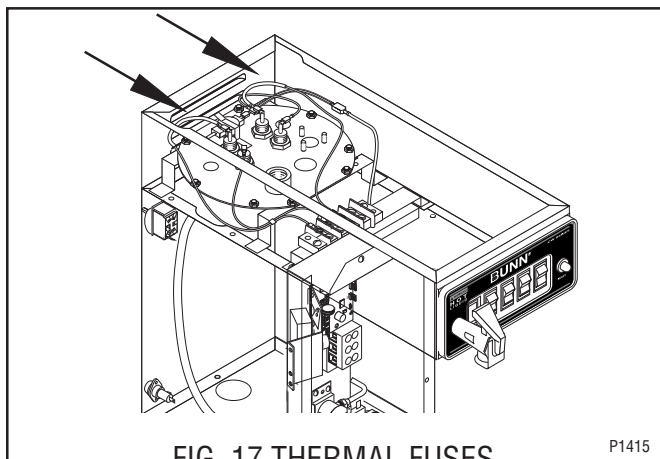


FIG. 17 THERMAL FUSES

P1415

#### Location:

The thermal fuses are located inside the rear of the hood connected to the left and right rear tank heater terminals.

#### Test Procedures:

1. Disconnect the brewer from the power source.
2. Disconnect the thermal fuse from the right tank heater terminal and tank heater terminal block or the thermal fuse from the left tank heater terminal and the tank heater terminal block.
3. With an ohmmeter, check for continuity across the thermal fuse terminals.

If continuity is present as described, the thermal fuse is operating properly.

If continuity is not present as described, replace the thermal fuse.

#### Removal and Replacement:

1. Disconnect the thermal fuse from the right tank heater terminal tank heater terminal block or the thermal fuse from the left tank heater terminal and the tank heater terminal block.
2. Remove thermal fuse and discard.
3. Connect new thermal fuse to right tank heater terminal tank heater terminal block or the left thermal fuse to the left tank heater terminal and the tank heater terminal block.
4. Refer to Fig. 18 when reconnecting thermal fuses.

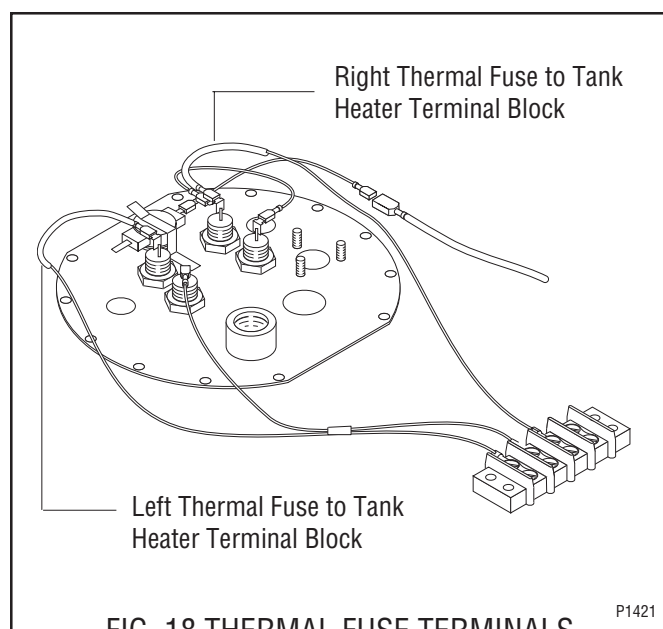
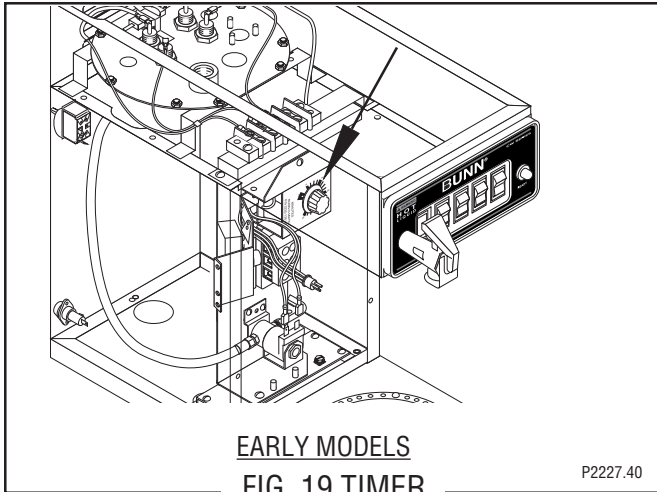


FIG. 18 THERMAL FUSE TERMINALS

P1421

## SERVICE (cont.)

### TIMER (Early Models)



#### Location:

The timer is located inside the front of the trunk on the upper right side of component bracket.

#### Test Procedure.

1. Disconnect the brewer from the power source.
2. Disconnect the polarized, three pin connector from the brewer wiring harness and rotate the brew timer dial fully counterclockwise.
3. With a voltmeter, check the voltage across sockets P2 & P3 (white and black wires) of the female connector when the "ON/OFF" is in the "ON" (upper) position. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt and 120/240 volt models.
4. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #5.

If voltage is not present as described, refer to the *Wiring Diagrams* and check the brewer wiring harness.

5. With a voltmeter, check the voltage across the sockets P1 & P2 (blue and white wires) of the female connector when the "ON/OFF" switch is in the "ON" (upper) position and start switch pressed. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt models and 120/240 volt models.
6. Disconnect the brewer from the power source.

7. Reconnect the three pin connector from main wiring harness to the timer.

If voltage is present as described, proceed to #8

If voltage is not present as described, refer to *Wiring Diagrams* and check the brewer wiring harness.

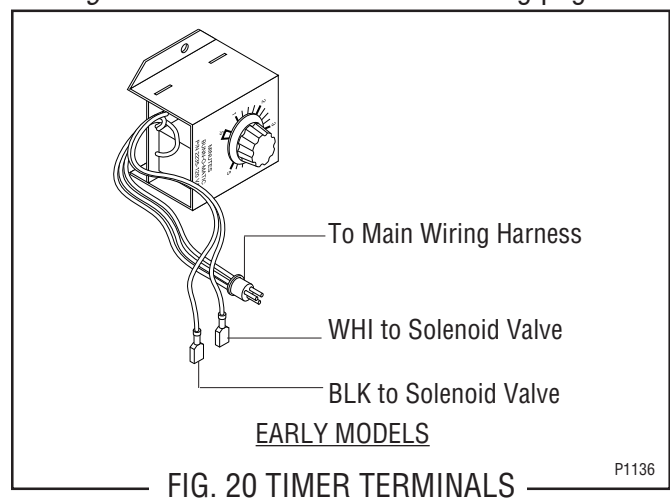
8. Disconnect the black and white wires to the solenoid.
9. With a voltmeter, check the voltage across the black and white wires when the "ON/OFF" switch is in the "ON" (upper) position and the "START" switch is pressed to the "START" (lower) position and released. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for approximately 20 seconds for two wire 120 volt models.
  - b) 120 volts ac for approximately 20 seconds for three wire 120/208 volt and 120/240 volt models.

If voltage is present as described, the brew timer is operating properly. Reset the timer dial as required, to obtain the desired brew volume.

If voltage is not present as described, replace the timer.

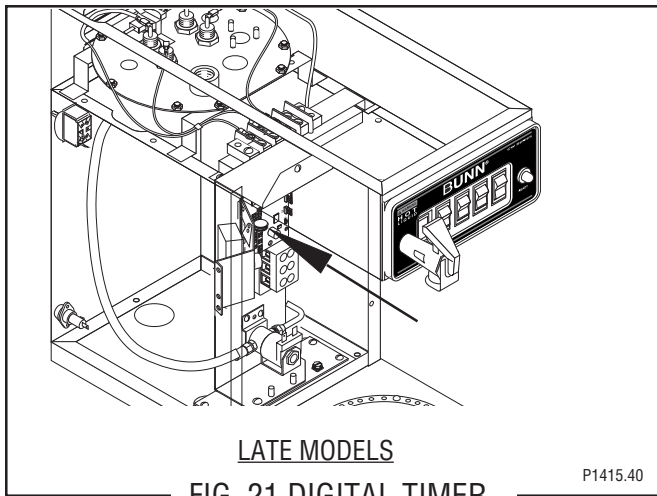
#### Removal and Replacement:

1. Remove all wires from the timer.
2. Remove the one #8-32 screw securing timer to component bracket.
3. Install new timer circuit board as described in *Late Model Digital Timer* section on the following pages.
4. Refer to Fig. 22 when reconnecting the wires.
5. Install the Timer Setting decal, provided with the replacement timer kit, to the rear of the front access panel, beneath the schematic.
5. Adjust the timer as required. Refer to *Late Model Digital Timer Section* on the following pages.



## SERVICE (cont.)

### DIGITAL TIMER (Late Models)



#### Location:

The timer is located inside the front of the trunk on the upper right side of the component bracket.

#### Test Procedure.

**NOTE:** Do not remove or install wires while timer board is installed. Pressure applied to one side may cause damage to the board.

1. Disconnect the brewer from the power source and remove the front access panel.
2. Remove the two #8-32 screws securing circuit board to the mounting bracket.
3. Remove circuit board and spacers (as required).
4. With a voltmeter, check the voltage across terminals TL1 and TL2 when the "ON/OFF" switch is in the "ON" (upper) position. Connect the brewer to the power source. The indication must be:
  - a) 120 volts ac for two wire 120 volt models
  - b) 120 volts ac for three wire 120/208 volt and 120/240 volt models.
5. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #6.

If voltage is not present as described, refer to the *Wiring Diagrams* and check the brewer wiring harness.

6. With a voltmeter, check the voltage across terminals TL1 and TL4 when the "ON/OFF" switch is in the "ON" (upper) position. Connect the brewer to the power source. The indication must be 0 volts.

If voltage is as described, proceed to #7.

If voltage is not as described, disconnect the brewer from the power source and replace the timer.

7. With a voltmeter, check the voltage across terminals TL1 and TL4 when the "ON/OFF" switch is in the "ON" position. Connect the brewer to the power source and press the "START" switch. The indication must be as follows:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt and 120/240 volt models.

If voltage is present as described, the brew timer is operating properly. Reset the timer as required, to obtain the desired brew volume.

If voltage is not present as described, disconnect the brewer from the power source and replace the timer.

#### Removal and Replacement:

1. Remove the two #8-32 screws securing circuit board to the mounting bracket.
2. Remove circuit board and spacers (as required).
3. Remove all wires from the timer.
4. Attach all wires to the replacement timer board prior to installation to the component mounting bracket. Refer to FIG. 22 when reconnecting the wires.
5. Install new circuit board with spacers (as required) to the component mounting bracket.
6. Adjust the timer as described below.

#### Timer Setting:

**NOTE:** Prior to setting or modifying volumes, check that the brewer is connected to water supply, the tank is properly filled, and a funnel and server are in place.

**NOTE:** All volume settings must be done with the sprayhead installed.

1. **Modifying brew volumes.** To modify a brew volume, first check that the SET/LOCK switch is in the "SET" position on the circuit board.

## SERVICE (cont.)

### DIGITAL BREW TIMER (Late Models)(cont.)

**To increase a brew volume,** place the ON/OFF switch in the “ON” position, press and hold the START switch until three clicks are heard. Release the switch and press it again one or more times. (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory.) Each time the switch is pressed, two seconds are added to the brew time period. Allow the brew cycle to finish in order to verify that the desired volume has been achieved.

**To decrease a brew volume,** place the ON/OFF switch in the “ON” position, press and release the START switch once for every two-second interval to be removed from the total brew time period; then immediately press and hold down the START switch until three clicks are heard. Release the switch. (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory). Allow the brew cycle to finish in order to verify that the desired volume has been achieved.

**2. Setting brew volumes.** To set a brew volume, first check that the SET/LOCK switch is in the “SET” position on the circuit board. Place the ON/OFF switch in the “ON” position, press and hold the START switch until three distinct clicks are heard and then release the switch. (Failure to release the switch within two seconds after the third click causes the volume setting to be aborted and previous volume setting will remain in memory.)

View the level of the liquid being dispensed. When the desired level is reached, turn the ON/OFF switch to “OFF”.

**NOTE:** Several ounces of water will continue to syphon from the tank after turning the switch “OFF”. The brewer remembers this volume and will continue to brew batches of this size until the volume setting procedure is repeated.

**NOTE:** When brewing coffee, volume will decrease due to absorption by the coffee grounds.

**3. Setting programming disable feature.** If it becomes necessary to prevent anyone from changing brew time once programmed, you can set the SET/LOCK switch to the “LOCK” position. This will prevent any further programming until switch is once again put into the “SET” position.

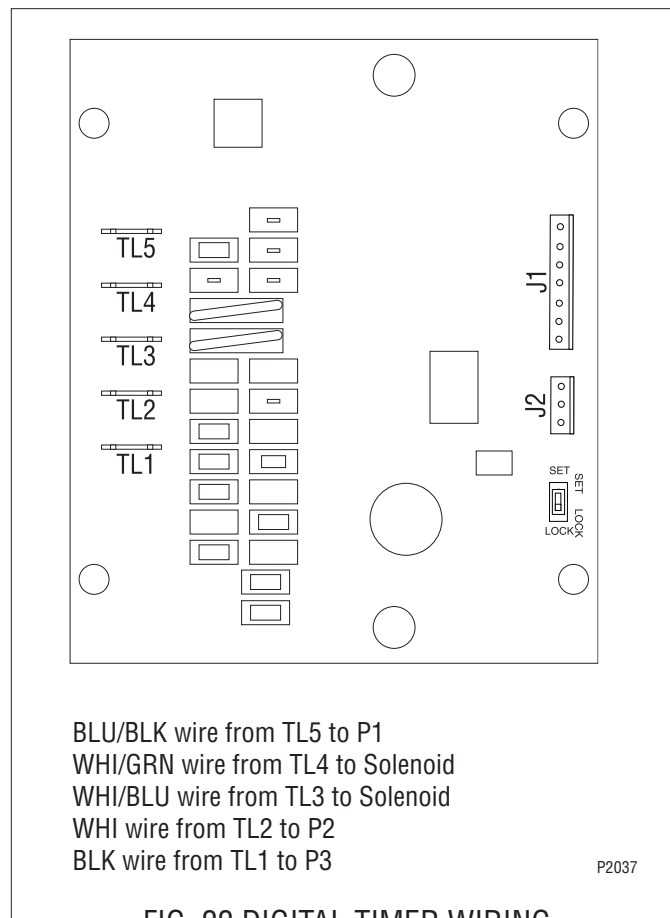


FIG. 22 DIGITAL TIMER WIRING



## SERVICE (cont.)

### WARMER ELEMENT(S)(CWTF MODELS ONLY)

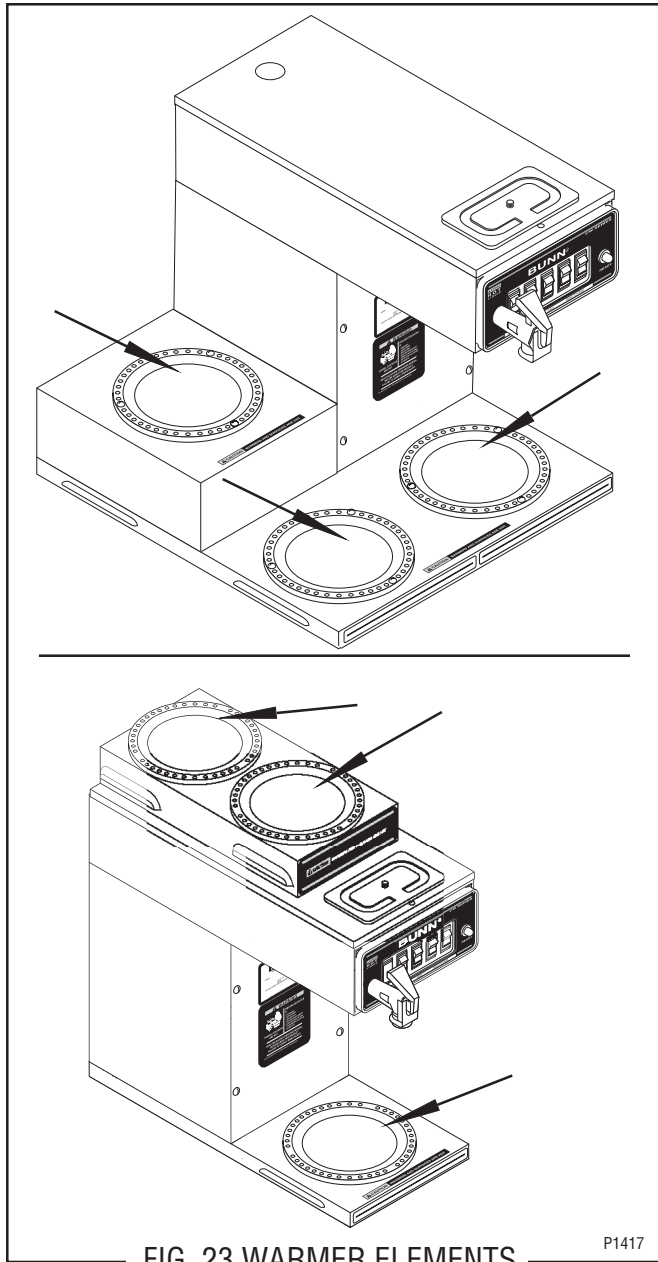


FIG. 23 WARMER ELEMENTS

#### Location:

The warmer elements are located under the warmer plates.

#### Test Procedures:

1. Disconnect the brewer from the power source.
2. With a voltmeter, check voltage across the white wire from the terminal block and the wire from the "ON/OFF" switch to the warmer element with the "ON/OFF" switch in the "ON" (upper) position. The indication must be:
  - a) 120 volts ac for two wire 120 volt models.
  - b) 120 volts ac for three wire 120/208 volt and 120/240 volt models.

4. Disconnect the brewer from the power source.

If voltage is present as described, proceed to #5.  
If voltage is not present as described, refer to *Wiring Diagrams* and check brewer wiring harness.

5. Check the continuity across the two terminals on the warmer element.

If continuity is present as described, reconnect the wires on the warmer element.

If continuity is not present as described, replace the warmer element.

#### Removal and Replacement:

1. Remove the three #4-40 screws securing the warmer assembly to the brewer.
2. Lift the warmer assembly from the brewer.
3. Disconnect the two wires from the warmer element terminals.
4. Remove the two #8-32 nuts securing the warmer element to the warmer plate.
5. Securely install new warmer element.
6. Reconnect the two wires to warmer element terminals.
7. Securely install warmer assembly on the brewer.
8. Refer to Fig. 24 when reconnecting the wires.

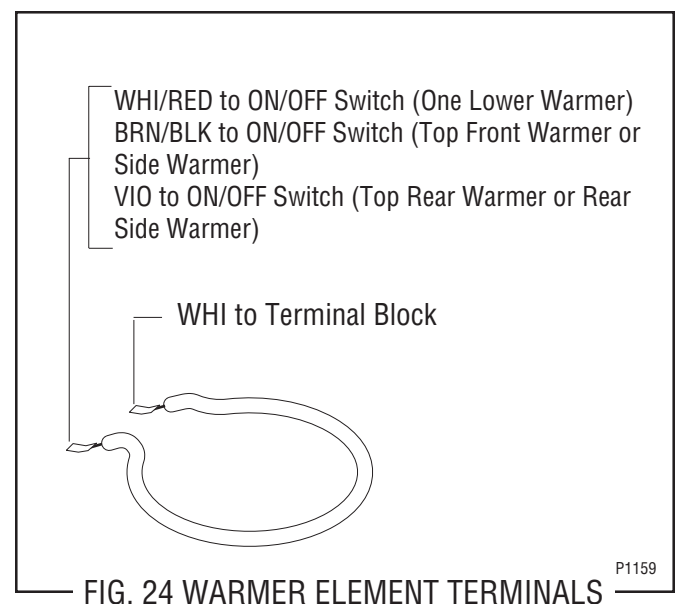
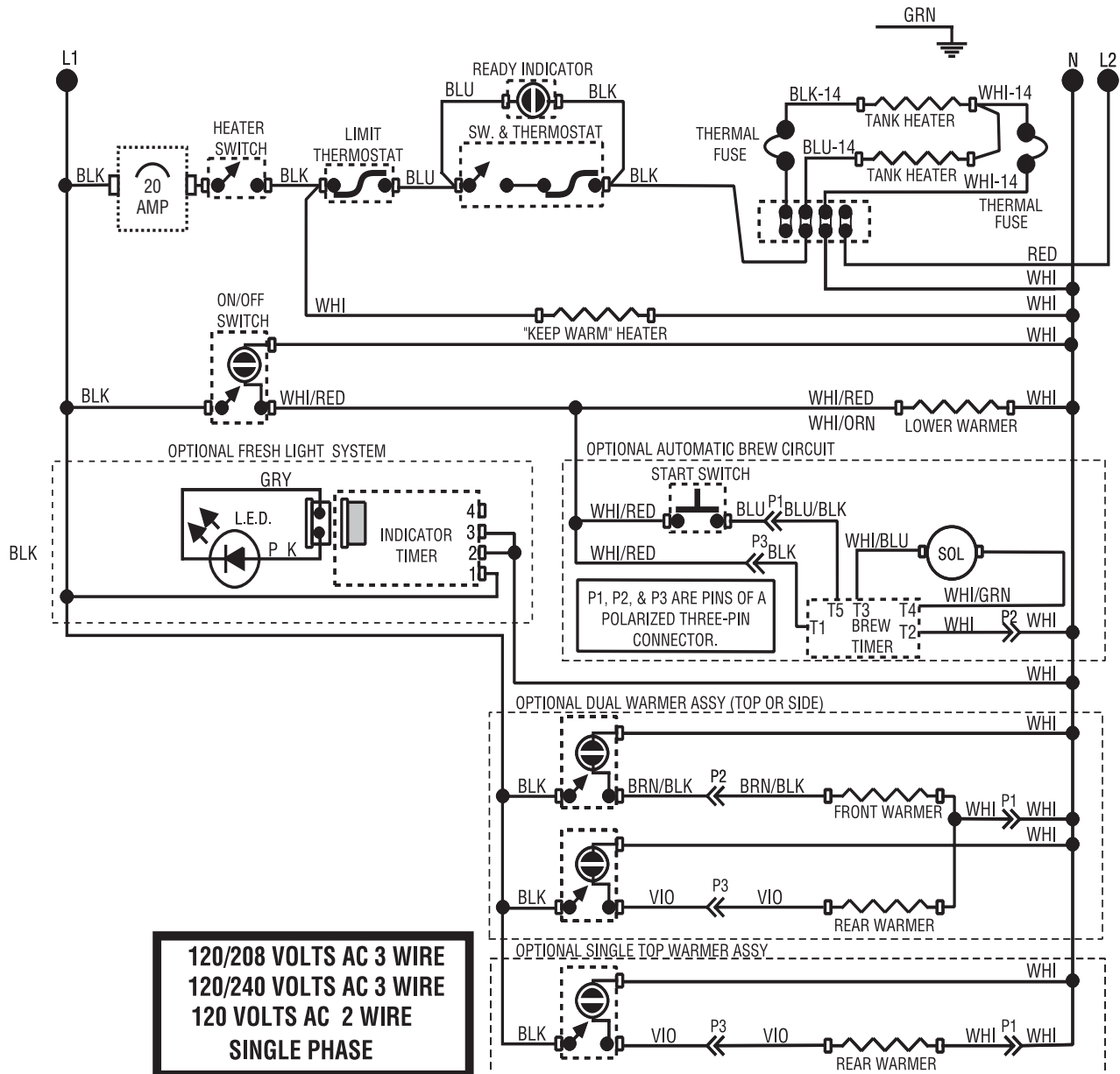


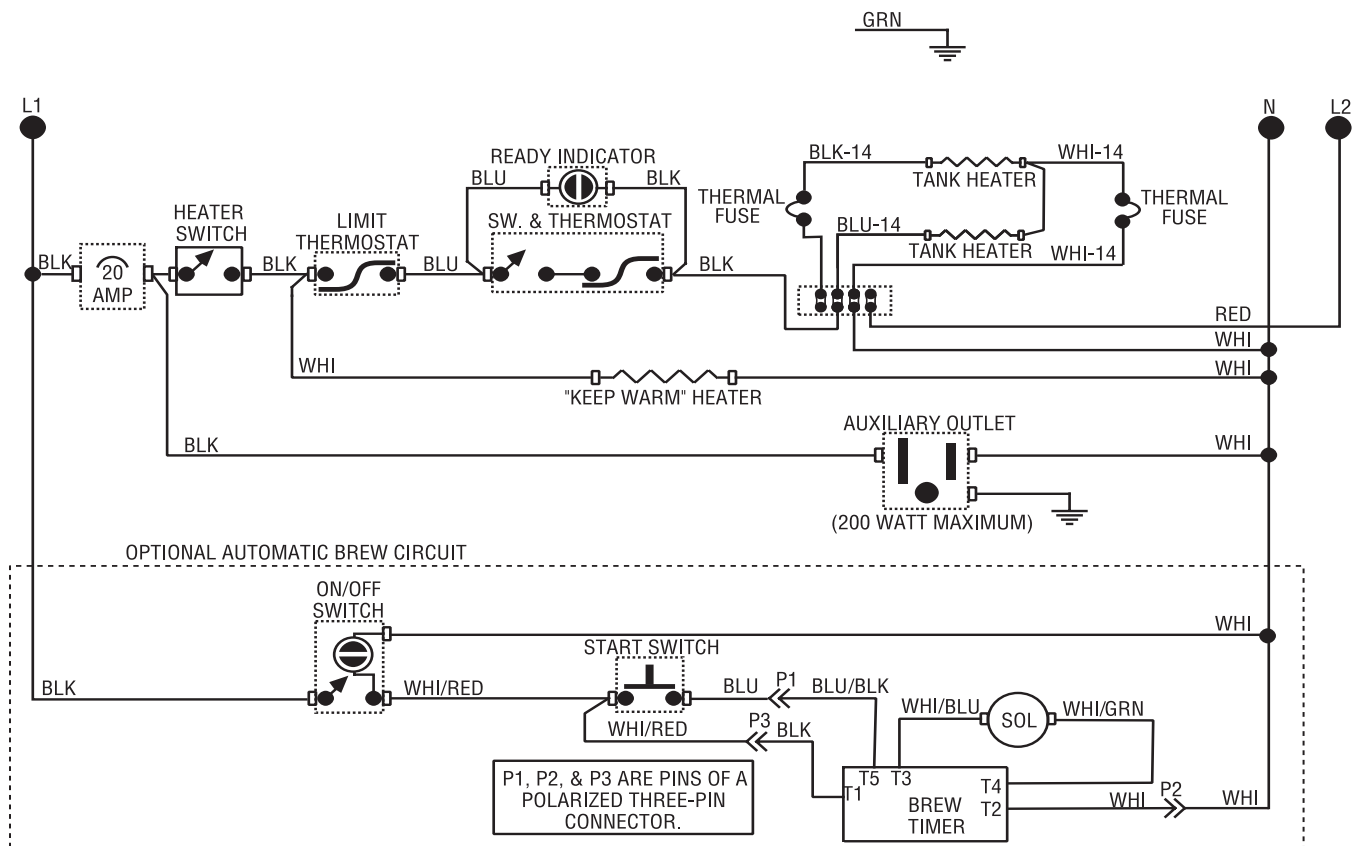
FIG. 24 WARMER ELEMENT TERMINALS



# SCHEMATIC WIRING DIAGRAM C-MV, CT-MV, CTF-MV, CWT-MV & CWTF-MV



# SCHEMATIC WIRING DIAGRAM FOR CWT-APS MV, CWTF-APS MV, CWTF-TS MV, CWTF-TSR MV



120/208 VOLTS AC 3 WIRE  
120/240 VOLTS AC 3 WIRE  
120 VOLTS AC 2 WIRE  
SINGLE PHASE